REMARKS

I. INTRODUCTION

In response to the Office Action dated July 8, 2010, claims 29, 31 and 33 have been canceled. Claims 1, 2, 4-8, 10, 11, 13-17, 19-28, 30 and 32 remain in the application. Entry of these amendments, and re-consideration of the application, as amended, is requested.

II. CLAIM AMENDMENTS

Applicants' attorney has made amendments to the claims as indicated above. The Applicants are not conceding in this application that those claims are not patentable over the art cited by the Examiner, as the present claim amendments and cancellations are only for clarifying the language of the claims and facilitating expeditious prosecution of the allowable subject matter noted by the examiner. Applicants respectfully reserve the right to pursue these and other claims in one or more continuations and/or divisional patent applications.

III. STATUS OF CLAIMS

Claims 1, 2, 4-8, 10-11, 13-17, and 19-33 were pending in the application. Claims 29, 31 and 33 have been canceled, leaving claims 1, 2, 4-8, 10, 11, 13-17, 19-28, 30 and 32 in the application.

Claims 29, 30 and 33 were rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement.

Claims 1, 8, 10, 17, 19, 26, 28, 30, and 32 were rejected under 35 U.S.C. §103(a) as being unpatentable over of U.S. Patent No. 6,931,370 to McDowell, in view of U.S. Patent No. 5,337,041 to Friedman, and further in view of U.S. Patent No. 6,429,779 to Petrillo.

Claims 2, 11, and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over McDowell in view of Friedman in further view of Petrillo, in further view of U.S. Patent No. 5,625,743 to Fiocca.

Claims 4, 5, 13, 14, 22, and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over McDowell in view of Friedman in further view of Petrillo, in further view of U.S. Patent No. 4,934,483 to Kallergis.

Claims 7, 16, and 25 are rejected under 35 U.S.C. §103(a) as being unpatentable over McDowell in view of Friedman in further view of Petrillo, in further view of U.S. Publication No. 2002/0173864 to Smith.

Claims 6, 15, and 24 are rejected under 35 U.S.C. §103(a) as being unpatentable over

McDowell in view of Friedman in further view of Petrillo, in further view of U.S. Patent No. 6,801,886 to Pai et al., and these rejections are being appealed.

IV. NON ART REJECTIONS

In paragraphs (5)-(6) of the Office Action, claims 29-30, and 33 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Applicant believes this rejection to be in error in that it was intended to reject claims 29, 31 and 33, as claim 30 does not recite the "all" limitation and is substantively analogous to claims 28 and 32, which were not rejected on this basis.

While the Applicant disagrees with the rejection of claims 29 and 33, the Applicant has canceled these claims (and claim 31) to expedite prosecution.

V. STATUS OF AMENDMENTS

Claims 29, 31 and 33 have been canceled.

VI. GROUNDS OF REJECTION TO BE REVIEWED

Whether claims 1, 8, 10, 17, 19, 26, 28, 30, and 32 are patentable under 35 U.S.C. § 103(a) over U.S. Patent No. 6,931,370 issued to McDowell (hereinafter, the McDowell reference) in view of U.S. Patent No. 5,337,041 issued to Friedman (hereinafter, the Friedman reference), and further in view of U.S. Patent No. 6,429,779 issued to Petrillo et al. (hereinafter, the Petrillo reference).

Whether claims 2, 11, and 20 are patentable under 35 U.S.C. § 103(a) over McDowell in view of Friedman in further view of Petrillo, in further view of U.S. Patent No. 5,625,743 issued to Fiocca (hereinafter, the Fiocca reference).

Whether claims 4, 5, 13, 14, 22, and 23 are patentable under 35 U.S.C. § 103(a) over McDowell in view of Friedman in further view of Petrillo, in further view of U.S. Patent No. 4,934,483 issued to Kallergis (hereinafter, the Kallergis reference).

Whether claims 7, 16, and 25 are patentable under 35 U.S.C. § 103(a) over McDowell in view of Friedman in further view of Petrillo, in further view of U.S. Publication No. 2002/0173864 to Smith (hereinafter, the Smith reference).

Whether claims 6, 15, and 24 are patentable under 35 U.S.C. § 103(a) over McDowell in view of Friedman in further view of Petrillo, in further view of U.S. Patent No. 6,801,886 issued to Pai et al. (hereinafter, the Pai reference).

VII. ARGUMENT

A. The References

1. The McDowell Reference

The McDowell reference discloses a system that can determine a rough estimate of loudness for psychoacoustic purposes. Component audio is stored and mixed in a compressed and simplified format that reduces memory requirements and processor utilization and increases the number of components that can be mixed without degrading audio quality. Techniques are also provided for "looping" compressed audio, which is an important and standard feature in gaming applications that manipulate PCM audio. In addition, decoder sync is ensured by transmitting frames of "silence" whenever mixed audio is not present either due to processing latency or the gaming application.

2. The Friedman Reference

A personal safety guard system enables a guardian or caretaker of a person or pet to transmit an alarm condition signal from a hand-held unit carried by the guardian. When the alarm condition signal is received by a portable alarm unit adapted to be worn by the person or pet under the guardian's supervision, the alarm unit operates to alert the wearer that its guardian is looking for them, and to alert others nearby that the wearer is in need of assistance by producing a number of different alarm indicators. The alarm indicators produced by the portable alarm unit include an intelligible voice message such as "Help, I'm lost" which is alternately sounded with a loud alarm sound, and flashing strobe lights. These alarm indicators, together with a confirmation signal transmitted from the alarm unit to the guardian's unit, enable the guardian to track and find their charge.

3. The Petrillo Reference

A telephone line monitoring and alarm apparatus capable of continuously monitoring telephone line status and activating an audio-visual alarm if the telephone line becomes inoperative, incorporates an integral telephone plug to permit direct plug-in connection of the apparatus to a standard telephone wall jack as a self-contained and autonomous unit without the use of interconnecting cables or cable-plug attachments. An integral dual telephone jack splitter permits the uninterrupted use of standard telecommunication equipment, such as telephones, answering machines, or facsimile equipment while the apparatus monitors telephone line integrity. Micropower

circuitry derives electrical power from the telephone line to provide visual ON status indication, and from a battery source independently of the telephone communication line voltage, to provide continuous telephone line monitoring, audio-visual alarms and audio-visual low battery voltage indication. The invention is intended to provide telephone subscribers with effective early detection and warning if the telephone line becomes inoperative due to intentional or accidental disruption of telephone service.

4. The Fiocca Reference

The first step for calculating a signal-to-mask ratio (806) for a subband in a subband in a subband audio encoder is calculating a signal level for each of the subbands based on an audio frame (604). Then, the masking level is calculated for the particular subband based on the signal levels, an offset function, and a weighting function (606).

5. The Kallergis Reference

Kallergis describes a method of reducing the overflying noise of airplanes having a propeller den by a piston engine. The propeller is arranged on the engine shaft in such a way that positive components of the engine sound pressure fall on negative components of the propeller sound pressure. It is preferable to use an engine/propeller combination in which the number of engine ignitions per revolution of the propeller shaft divided by the number of the propeller blades is an integer, preferably being equal to 1.

6. The Smith Reference

Smith discloses a method and system for digitally and automatically adjusting the audio volume of digitized speech signals received over a network such as the internet. The method includes: estimating an average frame volume estimate (VE) for each frame of data; calculating from a plurality of successive frame volume estimates at least one moving average of the volume estimates; comparing at least one of the moving averages with a known desired level that is associated with a psychoacoustically desirable audio volume level; calculating, independently of any compression applied to the data frame during encoding, a digital gain factor based upon the results of the aforementioned comparison; and adjusting a volume level of the audio data based upon the digital gain factor. The system includes several modules, which could be executed by software run on a microprocessor, for carrying out the method.

7. The Pai Reference

Pai discloses a system for improved digital data compression in an audio encoder. A threshold is established which depends on the bit rate of the input data. A determination is made whether the bit rate is above or below the established threshold. A masking index is calculated for the input data according to a first formula if the input data is being transmitted at a rate at or below the threshold. A second formula is used to calculate the masking index if the input data is being transmitted at a rate above the threshold. The masking index is used to generate a masking threshold, and data deemed insignificant relative to the masking threshold is ignored. In the preferred embodiment, a psycho-acoustic modeler, which is included in the encoding section of an encoding/decoding (CODEC) circuit, is used to determine a masking index. The masking index is then used to generate a masking threshold. A masking threshold is an information curve generated for and unique to each piece of audio data which enters the CODEC circuit. The psycho-acoustic modeler uses experimentally determined information about human hearing and, through a process called perceptive encoding, determines which parts of the input audio data will not be perceived by the human ear. The masking threshold is a curve below which the human ear cannot perceive sounds. The psycho-acoustic modeler compares the masking threshold uniquely generated for the specific piece of input audio data and compares the masking threshold to the input audio data. This comparison dictates to the encoding section of the CODEC circuit which of the tones and noises contained within the input audio data can be ignored without sacrificing sound quality.

B. Claims 1, 8, 10, 17, 19, 26, 28, 30, and 32 are Patentable Under 35 U.S.C. § 103(a) over McDowell in View of Friedman in View of Petrillo

With Respect to Claim 1: Claim 1 recites:

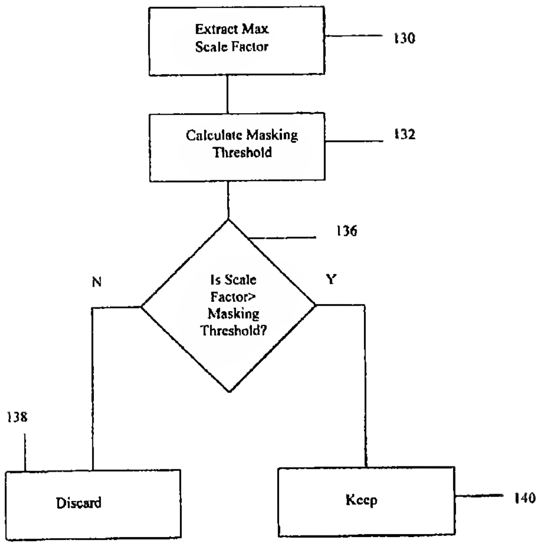
> *A method of automatic measurement of audio presence and level by direct processing of a data stream representing an audio signal in a processor, comprising:*
>
> *(a) extracting, in the processor, sub-band data from the data stream;*
>
> *(b) dequantizing and denormalizing, in the processor, the extracted sub-band data;*
>
> *(c) measuring, in the processor, an audio level for the dequantized and denormalized sub-band data without reconstructing the audio signal using channel characteristics;*
>
> *(d) comparing, in the processor, the measured audio level against one or more thresholds; and*
>
> *(e) triggering, in the processor, an alarm as determined by the comparing step (d), wherein the one or more thresholds are set to generate the alarm based on: (1) loss of the audio signal in the data stream or (2) when an average of the audio level in the data stream is too high or too low, in order to monitor the audio presence and level within the data stream and to adjust the audio level as desired.*

The Final Office Action states:

> 2. Regarding prior art McDowell, the applicant asserts that McDowell discloses a system wherein the bit allocation data used to define the quantization is fixed and that this does not read on the claim language. The examiner asserts that applicant is arguing something that is not claimed. The claim language as recite that the bit allocation data used to define the quantization is not fixed or that the bit allocation data is adaptive.

The Applicant has not argued something that is not claimed. Claim 1 recites the step of dequantizing and denormalizing the extracted sub band data in the processor. In the remarks accompanying the most recent amendment, the Applicants pointed out that Mc Dowell discloses or suggests neither dequantizing nor denormalizing extracted sub-band data.

Specifically, claim 1 recites the step of dequantizing and denormalizing the extracted sub-band data. According to the Office Action, McDowell teaches this step as follows:



Second, DTS Interactive unpacks the scale factors (step **120**) and uses them in a simplified psychoacoustic analysis (see FIG. **9**) to determine which of the audio components selected by the map function (step **54**) are audible in each subband (step **124**). A standard psychoacoustic analysis that takes into account neighboring subbands could be implemented to achieve marginally better performance but would sacrifice speed. Thereafter, the audio renderer unpacks and decompresses only those subbands that are audible (step **126**). The renderer mixes the subband data for each subband in the subband domain (step **128**), recompresses it and formats it for packing as shown in FIG. **4** (item **86**).

1. Mc Dowell Does Not Teach Dequantizing Extracted Sub-Band Data

Plainly, the foregoing does not disclose anything about dequantizing extracted sub-band data, nor does it disclose anything about denormalizing extracted sub-band data. On this basis alone, the rejection of claim 1 based upon Mc Dowell is in error.

The Applicants have also pointed out that Mc Dowell actually teaches away from the steps of dequantizing and denormalizing extracted sub-band data. McDowell discloses a system wherein the bit allocation data used to define the quantization is fixed (in the interest of computational efficiency).

> More specifically, the components are preferably encoded into a subband representation, compressed and packed into a data frame in which only the scale factors and subband data change from frame-to-frame. This compressed format requires significantly less memory than standard PCM audio but more than that required by variable length code storage such as used in Dolby AC-3 or MPEG. More significantly this approach greatly simplifies the unpack/pack, mix and decompress/compress operations thereby reducing processor utilization. In addition, fixed length codes (FLCs) aid the random access navigation through an encoded bitstream. High levels of throughput can be achieved by using a single predefined bit allocation table to encode the source audio and the mixed output channels. In the currently preferred embodiment, the audio renderer is hardcoded for a fixed header and bit allocation table so that the audio renderer only need process the scale factors and subband data.

col. 3, lines 25-41

This limits the sub-bands to fixed (rather than adaptive) intervals. This feature makes sense in McDowell because they are not considering psychoacoustic effects from sub-band to sub band, as described below:

> Second, DTS Interactive unpacks the scale factors (step **120**) and uses them in a simplified psychoacoustic analysis (see FIG. **9**) to determine which of the audio components selected by the map function (step **54**) are audible in each subband (step **124**). A standard psychoacoustic analysis that takes into account neighboring subbands could be implemented to achieve marginally better performance but would sacrifice speed. Thereafter, the audio renderer unpacks and decompresses only those subbands that are audible (step **126**). The renderer mixes the subband data for each subband in the subband domain (step **128**), recompresses it and formats it for packing as shown in FIG. **4** (item **86**).
>
> The computational benefits of this process are realized from having to unpack, decompress, mix, recompress and pack only those subbands that are audible. Similarly, because the mixing process automatically discards all of the inaudible data, the gaming programmer is provided greater flexibility to create richer sound environments with a larger number of audio components without raising the quantization noise floor. These are very significant advantages in a real-time interactive environment where user latency is critical and rich high fidelity immersive audio environment is the goal.

col. 11, lines 1-23

Since the bit allocation is set so that the quantization for all sub-bands is the same, McDowell teaches away from dequantizing extracted sub-band data.

2. Mc Dowell Does Not Teach Denormalizing Extracted Sub-Band Data

Claim 1 also recites that the extracted sub-band data is denormalized. This step is clearly not disclosed in the above excerpt from the McDowell reference. In fact, Mc Dowell teaches away from this step.

As described in the above passage, McDowell teaches that instead of doing anything with the sub-band data, the scale factor values that relate to the sub-band data are instead examined. Larger scale factor values mean that the sub-band data is larger, and smaller scale factor values mean that the sub-band data is smaller:

> More specifically, the rendering process commences by unpacking and decompressing each component's scale factors into memory on a frame-by-frame basis (step 56), or alternately multiple frames at a time (see FIG. 7). At this stage only the scale factor information for each subband is required to assess if that component, or portions of the component, will be audible in the rendered stream. Since fixed length coding is used, it is possible to unpack and decompress only that part of the frame that contains the scale factors thereby reducing processor utilization. For SIMD performance reasons each 7-bit scale factor value is stored as a byte in memory space, and aligned to a 32-byte address boundary to ensure that a cache line read will obtain all scale factors in one cache fill operation and not cause cache memory pollution. To further speed this operation, the scale factors may be stored as bytes in the source material and organized to occur in memory on 32 byte address boundaries.
>
> col. 6, lines 36-53

This allows McDowell to do the processing quicker than is the case if the sub-band data is denormalized using the scale factor, then examined to find the audio level. Therefore, McDowell does not teach denormalizing the extracted sub-band data and measuring an audio level for the extracted sub-band data.

3. Mc Dowell Does Not Teach Measuring an Audio Level for the Dequantized and Denormalized Sub-Band Data

Claim 1 also recites the step of *measuring, in the processor, an audio level for the dequantized and denormalized sub-band data without reconstructing the audio signal using channel characteristics.* As described above, Mc Dowell teaches determining the audio level from the scale factors, not from the sub-band data.

Claims 10 and 19 recite analogous features and are patentable for the same reasons.

Claims 8, 17, and 26 recite the features of claims 1, 10 and 19 and are patentable for the same reasons.

C. Claims 2, 11, and 20 are Patentable Under 35 U.S.C. § 103(a) over McDowell in View of Friedman in View of Petrillo in View of Fiocca

Claim 2 recites:

The method of claim 19, further comprising using a psychoacoustic model in determining a perceived level of the measured audio signal according to human ear sensitivity.

The Final Office Action notes that McDowell discloses using psychoacoustic measurements to determine perceptually irrelevant information according to human sensitivity, and argues that Fiocca discloses using a psychoacoustic model to determine a perceived audio signal level to cut out unnecessary data in an audio signal and thereby reduce the computational load in the processor.

First, claim 1 recites that the audio level is measured for the dequantized and denormalized sub band data without reconstructing the audio signal using channel characteristics. Claim 2 then recites the step of using a psychoacoustic model in determining the perceived level of that measured audio level.

Both McDowell and Fiocca teach an application of a psychoacoustic model, but that is where any similarity with claim 2 ends. Mc Dowell and Fiocca both teach applying a psychoacoustic model on a sub-band by sub-band basis, and *before* measuring the measurement of the audio level. This teaches away from claim 1 which recites that the psychoacoustic model is applied to the measured audio signal, not to individual sub-bands.

Second, the proffered reason to modify McDowell (to cut out unnecessary data in an audio signal, thereby reducing the computational load on the processor) is illusory. Both McDowell and Fiocca teach applying the psychoacoustic model on a sub-band by sub-band basis for the very reason that this technique reduces the computational load on the processor. Specifically, McDowell recites:

> Second, DTS Interactive unpacks the scale factors (step 120) and uses them in a simplified psychoacoustic analysis (see FIG. 9) to determine which of the audio components selected by the map function (step 54) are audible in each subband (step 124). A standard psychoacoustic analysis that takes into account neighboring subbands could be implemented to achieve marginally better performance but would sacrifice speed. Thereafter, the audio renderer unpacks and decompresses only those subbands that are audible (step 126). The renderer mixes the subband data for each subband in the subband domain (step 128), recompresses it and formats it for packing as shown in FIG. 4 (item 86).
>
> The computational benefits of this process are realized from having to unpack, decompress, mix, recompress and pack only those subbands that are audible. Similarly, because the mixing process automatically discards all of the inaudible data, the gaming programmer is provided greater flexibility to create richer sound environments with a larger number of audio components without raising the quantization noise floor. These are very significant advantages in a real-time interactive environment where user latency is critical and rich high fidelity immersive audio environment is the goal.

In contrast, claim 1 recites a system wherein a perceived audio level is determined from the measured audio level, which was generated from the dequantized and denormalized extracted sub-band data.

The Final Office Action argues:

> 3. Regarding claims 2,11 and 20 the applicant asserts that the prior art (McDowell and Fiocca) fails to teach using psychoacoustic measurements as recited . The examiner disagrees. The examiner asserts that prior Fiocca discloses using a psychoacoustic model to determine a perceived level of the measured audio signal according to human sensitivity (column 6,lines 57-67). It would have been obvious to modify McDowell so that the psychoacoustic model is used to determined a perceived level of the measured audio signal according to human sensitivity so that cut out unnecessary data in an audio signal thereby reducing the computational load on the processor.

Yes, Fiocca uses a psychoacoustic model, but as the Applicants have noted, it does so by analysis of the sub-bands, not a measured audio level:

> **The psychoacoustic unit (804), which may be implemented in accordance with MPEG audio by a digital signal processor such as the MOTOROLA DSP56002, analyzes the signal level and masking level in each of the frequency subbands. It outputs a signal-to-mask ratio (SMR) value for each subband. The SMR value represents the relative sen-**
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> col. 6, lines 58-63

Claims 11 and 20 recite analogous features and are patentable for the same reasons.

D. Claims 4, 5, 13, 14, 22, and 23 are Patentable Under 35 U.S.C. § 103(a) over McDowell in View of Friedman in View of Petrillo in View of Kallergis

Claim 4 recites:

> *The method of claim 1, wherein the channel characteristics are used to weight an instantaneous level.*

The Final Office Action argues:

> Regarding claim 4, McDowell as modified fails to disclose weighting an instantaneous level. Kallergis teaches of weighting an overall sound pressure level (column 2, lines 43-45). Weighting is known in the art and can be applied to any set of data, including sound data. It would have been obvious to modify McDowell as modified to include weighting of the instantaneous level to give it more influence in the final output.

Kallergis is directed to a method of attenuating noise in a propeller-driven aircraft by arranging the propeller shaft relative to the engine so that the sound pressure generated by the propeller are substantially antiphase of those that are generated by the engine. It has little to do with signal processing or of the operations and techniques described in either the McDowell or Petrillo references. Accordingly, Kallergis is also non-analogous art, and the Applicants respectfully traverse the notion that one of ordinary skill in the art would refer to Kallergis when solving a problem similar to that of McDowell. The notion that it would be obvious to do so to give the overall more influence on the final output is conclusory. The issue is why one of ordinary skill in the art would do so.

The cited portion of Kallergis:

> **No zero lines are plotted in the measurement diagrams in FIG. 1, or FIGS. 3 and 5, which are to be described below. The unweighted sound pressure level of the propeller is designated by L_P, the weighted level by L_{PA}. The weighted overall sound pressure level is L_A (FIG. 4).**

discloses only the well known fact that sound pressure levels can be expressed as weighted or unweighted.

E. Claims 7, 16, and 25 are Patentable Under 35 U.S.C. § 103(a) over McDowell in View of Friedman in View of Petrillo in View of Smith

Claims 7, 16 and 25 are rejected as unpatentable over McDowell, Friedman, Patrillo and Smith. Claims 7, 16 and 25 are patentable for the reasons described above with respect to the claims they depend upon.

F. Claims 6, 15, and 24 are Patentable Under 35 U.S.C. § 103(a) over McDowell in View of Friedman in View of Petrillo in View of Pai

Claims 6, 15 and 24 are rejected as unpatentable in view of McDowell, Friedman, Patrillo, and Pai. Claims 6, 15 and 24 are patentable for the reasons described above with respect to the claims they depend upon.

VIII. CONCLUSION

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Should any fees be associated with this submission, please charge Deposit Account No. 50-0383.

Respectfully submitted,

Date: September 8, 2010

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